B

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/624,385	07/27/2000	Tatsushi Katayama	35.G2626	9572

5514 7590 07/15/2005

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
WANG, JIN CHENG	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 07/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/624,385	Applicant(s) KATAYAMA ET AL.	
	Examiner Jin-Cheng Wang	Art Unit 2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/11/2005 and 6/3/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-8,11-13 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-8,11-13 and 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/11/2005 has been entered. Claims 1, 6, 11, 26-29 have been amended. Claims 3-4, 9-10,14-25 have been canceled. Claims 1-2, 5-8, 11-13 and 26-29 are pending in the present application.

Response to Arguments

Applicant's arguments filed Sept. 27, 2004 have been fully considered but they are not persuasive. As addressed below, Xiong, Shum and Teo teach the claim limitations.

Applicant argues in essence with respect to the claim 1 and similar claims that Teo does not teach *automatically* setting the mapping mode. However, Xiong teaches in figures 2 and 3 a user interface and *a global optimization* that *automatically* provides feedback to the computer system when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong further teaches a human interaction being present throughout the image synthesis process

to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene **when necessary**.

Xiong discloses in column 8, lines 18-58 that **a panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane*** (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. Xiong describes that a user can alternatively intervene to select a viewing plane. Therefore Xiong at least suggests automatically setting a mapping surface without a user intervention to determine the mapping mode.

Teo teaches that the viewing software can *automatically* invert the projection by automatically straightening out the portion of the panoramic image being displayed and thereby automatically setting the mapping mode by the viewer software (column 7-8). Furthermore, the claim limitation of "automatically setting the mapping mode" does not necessarily imply automatically setting the mapping surface. Teo teaches the image processor for automatically transforming the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the second surface geometry and therefore automatically setting the mapping mode of mapping the images to the *selected* surface geometry (column 7). Teo teaches in column 10 the mapping mode of mapping onto the planar surfaces such as mapping the panorama images onto a cube and the mapping mode of mapping the panorama images onto polyhedral surfaces to form cylindrical panorama images. Once the geometry is selected either by a user or by the viewer software, the image processor automatically transforms the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the surface geometry. Therefore, the mapping

mode is automatically set by the viewer software because the steps involved in the mapping or transforming the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the changed/selected geometric surface are automatically performed by the software. Although Teo also teaches a user can intervene in selecting a mapping surface, however, the mapping mode of mapping the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto a selected geometric surface is automatically set by the software. It is also noted that each mapping mode of transforming the panoramic scene corresponds to a selected geometric surface.

Although Teo teaches that a user can change a mapping surface (column 11, lines 1-9) by adjusting the shape of the mapping surfaces so that a given cylindrical panoramic image can be transformed to produce a modified panoramic image, the procedure can be automated by the computer software. Teo therefore teaches *automatically* setting a mapping mode or changing the plane for mapping the panoramic image by the computer through a user interface or by the computer software without the user interface.

Teo further discloses the horizontal placement of image by projecting a scene onto a cube so that horizontal lines of the scene appear horizontal in the panoramic image, and vertical placement of image by projecting the panoramic image on the *vertical cylinder* or by rotating the polyhedral surface relative to a cylindrical panoramic image and making adjustments to the sides and edges of the polyhedral surface so that the placement of images appear vertically on the mapping surface. Teo teaches the user interface enabling the user to rotate the polyhedral surface relative to a cylindrical panoramic image and making adjustments to the sides and edges of the polyhedral surface so that the placement of images appear vertically on the mapping surface.

Shum teaches a plurality of mapping modes such as zooming and panning the screen images of the interior scene shown in the panoramic view of Fig. 10A wherein the mapping surfaces within panoramas are different (See Figs. 11A and 11B and column 23-24) and changing the type of panoramas such as the spherical panoramas (Figs. 15A-15B) and the planar panoramas (Figs. 16A-16B). Shum teaches a setting step of zooming/panning the panorama and setting the spherical panoramas (column 23-24) by the interactive user interface so that the mapping mode changes in which each resulting panorama has different mapping surfaces (column 23-24). Shum further teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined panoramic view of a 3D scene or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model in response to the change in the geometric constraints determined by the projection plane or in response to the change in the panoramic view. The geometric constraints change due to the change in the projection plane from a planar panorama to a spherical panorama wherein the planes within the spherical panorama are changed to spherical planes and the panorama view can be changed as well by zooming/panning panorama and/or selecting a portion of the panorama. Therefore, un-solvability of the linear equations occurs *in the process of changing the mapping mode* because the change in the mapping mode or the change in the geometric surface also changes the geometric constraints governing the linear equations. **When the linear systems of equations are not solvable, a user can switch the mapping plane orientation or changing the mode of projection surface to meet the**

constraint equations requirements wherein the plane normals have changed. Moreover, the projection space can be in the form of any shape such as spherical or planar and by changing the camera's point of view and/or the panorama view and the coordinates and directions of the plane normals, the projection space is effectively changed and accordingly the mapping mode is changed (column 13-24).

However, Shum teaches changing the mapping mode by zooming and panning the screen images of the interior scene shown in the *initial* panoramic view of Fig. 10A (See Figs. 11A and 11B and column 23-24) and changing the type of panoramas such as the spherical panoramas (Figs. 15A-15B) and the planar panoramas (Figs. 16A-16B). Shum teaches a setting step of zooming/panning the panorama and setting the spherical panoramas (column 23-24) by the interactive user interface so that the mapping mode changes wherein each resulting panorama has different mapping surfaces in accordance with the user input commands (column 23-24) wherein the panorama mapping surfaces change as a result of the zooming and panning. It is noted that this user interface can be automated by the computer software.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 5-8, 11-13, and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiong et al. U.S. Patent No. 6,434,265 (hereinafter Xiong), and further in view

of Shum et al. U.S. Patent No. 6,271,855 (hereinafter Shum) and Teo U.S. Patent No. 6,246,413 (Teo).

3. Re Claims 1 and 26:

(a) Xiong teaches an image synthesis method comprising:

An input step, of inputting a plurality of image data representing a plurality of images (e.g., column 9, lines 20-30);

A placement information generating step, of generating placement information about the horizontal and vertical placement direction of the plurality of images, determined by the horizontal and vertical placement direction of the plurality of images represented by the image data inputted in the input step (e.g., column 16, lines 35-45);

A placement information obtaining step of obtaining the placement information about a plurality of images in which adjacent images have a common subject region (*e.g., in column 4, lines 5-40, Xiong teaches a method for constructing a panorama from rectilinear images in 3D through projective registration and calibration including: (1) the projective registrations of overlapping images, (2) calibration and global optimization of these images, a self calibration in which 2D image planes are positioned as 3D planes in space*);

A setting step of setting one mapping mode out of a plurality of mapping modes, each mapping mode corresponding to a different mapping surface (*e.g., in column 8, lines 18-58 of Xiong, it is stated that "overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane for viewing". The Xiong discloses*

some typical geometry on which panoramas are formed; In column 8, lines 18-58, Xiong further discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection onto a chosen viewing plane such as cubic, polyhedral, cylindrical and spherical geometries); and

A synthesis step of combining the plurality of images by using the mapping mode set in the setting step (*e.g., in column 4, lines 5-40 of Xiong, it is stated that the composing or blending in which images are ready to be re-projected to a 3D environment map with pixels in overlap regions being composed from multiple; In column 8, lines 18-58, Xiong further teaches that overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane for viewing. The Xiong further discloses some typical geometry on which panoramas are formed*);

A changing step, of changing the mapping mode (*In column 4, lines 40-50, it is stated that "the projection module may be controlled through the user interface 230 as well, to allow a user to select what geometry will be projected onto". Therefore, Xiong teaches a changing step through the user interface 230 by selecting a geometric surface out of a plurality of geometric surfaces each corresponding to a different mapping surface*).

- The Examiner interprets "a placement information obtaining step of obtaining placement information about a plurality of images in which adjacent images have a common subject region" as an automatic registration and calibration step of registering the overlapping

images and capturing common overlapping areas between overlapping images and minimizing the average squared pixel intensity difference with respect to certain transformation parameters.

- The Examiner interprets the mapping mode as mapping images onto a geometric surface such as a planar or a cylindrical surface (Applicant's specification, page 1, lines 20-25). Accordingly, the Examiner interprets the setting step of setting a mapping mode as the selecting step of selecting a geometric surface. In column 8, lines 18-58, Xiong discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane* (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. In column 4, lines 40-50, it is stated that "the projection module may be controlled through the user interface 230 as well, to allow a user to select what geometry will be projected onto". Therefore, Xiong teaches a selecting step of selecting a geometric surface out of a plurality of geometric surfaces each corresponding to a different mapping surface in accordance with the obtained placement information. As applied to the present application, Xiong fulfills the claimed limitation of a setting step of setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with said obtained placement information.

(b) However, Xiong is silent to "a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes, each mapping mode corresponding to a different mapping surface, *without a user intervening* to determine the mapping mode or the corresponding mapping surface, in accordance with the horizontal and vertical placement direction of the

plurality of images having a common subject region obtained in the placement information obtaining."

(c) Teo teaches the claim limitation of a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes, each mapping mode corresponding to a different mapping surface, *without a user intervening* to determine the mapping mode or the corresponding mapping surface, in accordance with the horizontal and vertical placement direction of the plurality of images having a common subject region obtained in the placement information obtaining (*Teo teaches that the viewing software can <u>automatically</u> invert the projection by automatically straightening out the portion of the panoramic image being displayed and thereby <u>automatically setting the mapping mode</u> by the viewer software in column 7-8. Furthermore, Teo teaches the image processor for automatically transforming the first digital panoramic image into a second digital panoramic image corresponding to the projection of the scene onto the second surface geometry and therefore automatically setting the mapping mode of mapping the images to the selected surface geometry in column 7. Teo teaches in column 10 the mapping mode of mapping onto the planar surfaces such as mapping the panorama images onto a cube and the mapping mode of mapping the panorama images onto polyhedral surfaces to form cylindrical panorama images. Teo teaches horizontal placement of image by projecting a scene onto a cube so that horizontal lines of the scene appear horizontal in the panoramic image and vertical placement of image by projecting the panoramic image on the vertical cylinder or by rotating the polyhedral surface relative to a cylindrical panoramic image and making adjustments to the sides and edges of the polyhedral surface so that the placement of images appear vertically on the mapping surface. Although Teo discloses user may*

intervene in changing a mapping surface, e.g., Teo teaches that a user can change a mapping surface, see column 11, lines 1-9, Teo does not teach away from the claim limitation of "without a user intervening to determine the mapping mode" because a user changes a mapping surface, not a mapping mode. The mapping mode is automatically determined by the viewer software. Moreover, any manual procedure of changing a mapping surface can be converted to a software-automated procedure. See In re Venner, 120 USPQ 192, 194; 262 F2d 91 (CCPA 1958)).

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Teo's setting step because Xiong discloses in column 8, lines 18-58 that **a panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane*** (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. Xiong describes that a user can alternatively intervene to select a viewing plane. Therefore Xiong at least suggests automatically setting a mapping surface without a user intervention to determine the mapping mode.

(e) One having the ordinary skill in the art would have been motivated to do this because setting a mapping mode out from a plurality of mapping modes serves for the purpose of eliminating visible artifacts and providing a best projection (Teo column 10).

(f) However, Xiong and Teo are silent to issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode in the claim limitation of "a generating step, of issuing, when an image formed by changing the mapping mode in the changing step does not comply with a predetermined condition set in accordance with the mapping mode, a

warning and generating a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view" (i.e., generation of a warning message).

(g) Shum implicitly teaches issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode in the claim limitation of "a generating step, of issuing, when an image formed by changing the mapping mode in the changing step does not comply with a predetermined condition set in accordance with the mapping mode, a warning and generating a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view while simultaneously generating and displaying the synthesized image within the predetermined range of viewing angle" (*e.g., Shum teaches a plurality of mapping modes such as zooming and panning screen images of the interior scene shown in the panoramic view of Fig. 10A. See Figs. 11A and 11B and column 23-24. Shum also teaches the type of panoramas such as the spherical panoramas in Figs. 15A-15B and the planar panoramas in Figs. 16A-16B. Shum teaches a setting step of zooming/panning the panorama and setting the spherical panoramas in column 23-24 by the interactive user interface so that the mapping mode changes wherein each resulting panorama has different mapping surfaces in accordance with the user input commands. Shum further teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined angle of view such as the panoramic view of a 3D scene or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to*

indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model when the projection plane is changed or when the angle of view is changed in response to the user commands, e.g., the projection plane is changed from a planar panorama to a spherical panorama wherein the planes within the spherical panorama are changed to spherical planes and the panorama view can be changed as well by zooming/panning panorama and/or selecting a portion of the panorama. When the linear systems of equations are not solvable, a user can switch the mapping plane orientation or changing the mode of projection surface to meet the constraint equations requirements by changing the plane normals. Moreover, the projection space can be in the form of any shape such as spherical or planar and by changing the camera's point of view and/or the panorama view and the coordinates and directions of the plane normals, the projection space is effectively changed and thereby the mapping mode is changed. See column 13-24.)

(h) It would have been obvious to one of ordinary skill in the art to have incorporated the Shum's warning message generation step because Xiong suggests a generating step of generating a synthesized image in accordance with the predetermined condition (Xiong column 3, lines 35-55; column 17, lines 15-67; column 18, lines 1-4). Moreover, Xiong teaches in figures 2 and 3 a user interface and a global optimization that provides feedback to the computer system such as issuing warning messages on the computer monitor 218 when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane (and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects) due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong also points to a seamless multi-

resolution average blending method that would result in an absent of shadow effects (column 14, lines 1-45). Xiong further teaches a human interaction being present throughout the image synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary and therefore the claimed limitation suggests an obvious modification of Xiong because providing feedback to users is similar to issuing a message to users in a user interaction with the nonlinear optimizations when the changing step does not comply with a predetermined condition set or user-selected parameter set.

(i) One having the ordinary skill in the art would have been motivated to do this because this would have provided the user the informative message such as issuing a warning message through the user interaction when convergence to the predetermined condition setting cannot be obtained in the image synthesis (Xiong column 17, lines 15-67, column 18, lines 1-4) for non-solvable optimization problems (Shum column 18, lines 38-67).

Claim 2:

Claim 2 recites all the limitations of claim 1 and adds the limitation of "a focal length obtaining step." Xiong teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector of which the focal length is a component (column 11, lines 15-42).

Claim 5:

The claim 5 recites all the limitations of claim 1 and adds the limitation of "a displaying step of displaying a cuttable rectangular region." Xiong teaches how to align images more precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

4. Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of "an image synthesis apparatus" and "a displaying step of displaying a cuttable rectangular region". However, Xiong further discloses in figure 3 an apparatus for image synthesis. Xiong teaches how to align images more precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

Claim 7:

The claim 7 recites all the limitations of claim 6 and adds the limitation of "a focal length obtaining step." The Xiong reference teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector in his image synthesis apparatus of figure 3 because the focal length is a component of that vector (column 11, lines 15-42).

Claim 8:

The claim 8 recites all the limitations of claim 6 and adds the limitation of "a changing step of changing the mapping mode." Xiong teaches that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane such as cubic, polyhedral, cylindrical and spherical geometries (column 8, lines 18-58).

5. Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method. However, Xiong further discloses the claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method (e.g., in column 3, lines 54-57, it is stated "a program residing in system memory 220 which stores output data and other data").

Claim 12:

The claim 12 recites all the limitations of claim 11 and adds "a focal length obtaining step." Xiong teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector of which the focal length is a component (column 11, lines 15-42).

Claim 13:

The claim 13 recites all the limitations of claim 11 and adds the limitation of "a changing step of changing the mapping mode." Xiong teaches that panorama is constructed on a particular

geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane such as one of the cubic, polyhedral, cylindrical and spherical geometries (column 8, lines 18-58).

6. Claim 27:

The claim 27 encompasses the same scope of invention as that of the claim 26 except additional claim limitation of "a displaying step of displaying a cuttable rectangular region." Xiong teaches how to align images more precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

7. Claim 28:

The claim 28 encompasses the same scope of invention as that of claim 26 except additional claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method. However, Xiong further discloses the claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method (e.g., in column 3, lines 54-57, it is stated "a program residing in system memory 220 which stores output data and other data").

Claim 29:

The claim 29 encompasses the same scope of invention as that of the claim 1. The claim 29 is subject to the same rationale of rejection set forth in the claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (571) 272-7664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jcw

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600